

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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TITLE: METHOD AND APPARATUS FOR DETECTING MASTITIS

Amendment D: REMARKS

Upon entry of the present amendments, Claim 21 - 29 have been canceled and new Claims 30 - 36 substituted therefor. Reconsideration of the rejections, in light of the forgoing amendments and present remarks, is respectfully requested. The present amendments have been entered for the purpose of further distinguishing the present invention from the prior art.

In the Office Action, Claims 21, 25, and 29 were rejected under 35 U.S.C. § 103(a) as anticipated being unpatentable over the Kolehamainen British patent in view of the Nelson publication. Claims 22 - 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kolehmainen British patent in view of the Nelson publication and further in view of the Knight European patent. Claims 26 - 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kolehmainen British patent in view of the Aerojet British patent.

As an overview to the present reply, Applicant has revised previous independent Claim 21 in the form of new independent Claim 30. New independent Claim 30 incorporates the limitations of previous independent Claim 21 and a portion of the limitations of dependent Claim 26. In particular, the step of "forming a reaction chamber having an interior volume" is recited. Additionally, the step of "increasing said interior volume of said reaction chamber so as to draw a liquid sample of the milk" has been introduced in the new independent Claim 30. Furthermore, the

step of "introducing a reagent" has been revised to "drawing a reagent". As such, the present steps in independent Claim 30 reflect the fact that there is a volume that has increased so as to effectively draw the milk from the milk line of an automated milking system and also draw the reagent into the interior volume of the reaction chamber. Applicant respectfully contends that these features serve to distinguish the present invention from the prior art combination.

Importantly, in the present invention, a system has been designed whereby the testing of milk can be carried out in a process-type of manner rather than a sampling process. As was recited in the original specification, there is a need for a "milking production line" for the effective testing of milk. This was recited in paragraph [0012] of the original specification as follows:

Economic pressures on farmers are ever increasing, and, particularly on large farms, milking is becoming ever more automated and comparable to an industrial production line. There is pressure to reduce the time required to milk each cow, and to reduce the amount of human intervention required. Thus, there is a need for a fully automated milk testing method which can be incorporated into the milking "production line" and used to test the milk from each cow every day, or even every milking, without requiring a dairyman to spend time testing each animal.

Additionally, the present invention, as defined by independent Claim 30, can carry out the testing of the milk without human intervention. This was recited in the original specification in paragraph [0038] as follows:

By virtue of this aspect of the invention, testing of milk within an automated system may easily be carried without human intervention. The combination of means for drawing fluid into the chamber and expelling fluid from the chamber, and light detector into a single unit simplifies construction and hence reduces the cost of such a testing system.

Additionally, the ability to effectively and automatically draw milk into the reaction chamber serves

to distinguish the present invention from the prior art. The importance of such a step was recited in original specification in paragraph [0044] as follows:

According to a fourth aspect of the invention, we provide a milk line for an automatic milking system, the milk line including a conduit for milk, a generally fluid and light tight chamber of variable capacity including an inlet port and an outlet port, the inlet port being connected to the milk conduit by means of an auxiliary milk conduit, means to increase the capacity of the chamber in order to draw milk into the chamber from the milk conduit via the inlet port or to decrease the capacity of the chamber to expel fluid in the chamber through the outlet port, and a light detector to detect any light emitted from the fluid in the chamber.

As such, the steps of the method described in independent Claim 30 serve to provide the basic steps whereby an automatic system can be utilized for the detection of an infection in the mammal.

The prior art Kolehamainen British patent describes an early prior art system for the testing of milk. This system is entirely directed toward the testing of milk on a sample-by-sample manner or batch manner. In particular, an individual sample is placed into cuvette. The cuvette is then placed within light-tight reaction chamber so as to press upon an elevator that is spring supported upon a cap. A plug is introduced so as to move the sample into proximity with a photodiode. This system is an effective testing method for the milk. However, it cannot be carried out on an automated basis.

The Kolehamainen British patent fails to show the "increasing of the interior volume of the reaction chamber so as to draw a liquid sample of milk". It does not teach or suggest any such drawing from a milk line of an automated milking system. The Kolehamainen British patent also does not suggest the step of "drawing" of the reagent into the interior volume of the reaction chamber. As such, the Kolehamainen British patent only describes what is known in the art, that is,

a sample-by-sample batch testing method. It cannot be integrated into a milking system so as to provide for the automated testing of milk as it is being delivered from the mammal.

The Nelson publication merely shows an automated milking system. The Nelson publication describes a testing procedure whereby the milk is extracted from the udders of the mammal. The Nelson publication fails to provide any disclosure of the introduction of the reagent into the reaction chamber. It does not suggest the step of reacting the light-amplifying compound with the substance produced by cells of the mammal in response to the infection prior to the liquid sample being introduced into the reaction chamber. The Nelson publication does not show or suggest any step of increasing an interior volume of the reaction chamber so as to "draw" a liquid sample from the milk line of the automated milking system. Additionally, the Nelson publication fails to show the steps of "drawing" the reagent into the interior volume of the reaction chamber.

Fundamentally, it is very difficult to see how the system disclosed in the Nelson publication can be combined, in any way, with the teachings of the Kolehamainen British patent. The Kolehamainen British patent is directly associated with a sample-by-sample batch technique. It would be difficult to see what component of the Nelson publication could be combined with the cuvette of the Kolehamainen system in order to show an automated process. Fundamentally, this prior art process does not show any technique for the "drawing" of the milk and the reagent. As such, Applicant respectfully contends that this prior art combination does not make obvious the teachings of the present invention.

The prior art Aerojet British patent describes a method for indicating an assay of the bacteriological content of a sample fluid. The process of the Aerojet British patent was described on page 1, lines 71 - 90 as follow:

Fluid containing the sample to be monitored is placed in sample container 11 from which conduit 12 is brought into cell 10. The reagent to be used, typically a mixture of luminol and hydrogen peroxide, is placed in container 13 from which conduit 14 is brought into cell 10. Conduit 15, leading from within cell 10, leads to a valve 16 which is operable by arm 17 from solenoid 18. The output from valve 16 is carried through conduit 19 to trap 20. Conduit 22 connects trap 20 to vacuum source 23 which, when valve 16 is opened, causes fluid to be drawn from containers 11, 13 into and through cell 10, through valve 16 to trap 20. Fluid may comprise a liquid mixture or a liquid-gas mixture, the liquid of which will be diverted by trap 20 while the gas of which will enter vacuum source 23.

As such, the Aerojet British patent relies upon a valving system in order to move fluid. It does not suggest the step of "increasing the interior volume of the reaction chamber so as to draw a liquid sample of the milk from a milk line of an automated milking system". It also fails to show the step of drawing the reagent into the interior volume of the reaction chamber. Once again, one having ordinary skill in the art of the present invention would find it difficult to combine the teachings of the Aerojet British patent with either the Kolehamainen British patent or the Nelson publication in order to arrive at the system of the present invention. Quite clearly, the system of the present invention is specifically configured for an automated milking process associated with a dairy farm. As such, as the cow is being milked, the milk can be properly tested in an continuous and automated manner. The prior art combination fails to show the steps of the present invention and the results achieved by the present invention.

Dependent Claims 30 - 34 correspond, respectively, to the limitations found in previous dependent Claims 22 - 25. Dependent Claims 35 and 36 corresponds to certain different recitations found in previous dependent Claim 26. In particular, dependent Claim 25 recites the step of "moving said piston upwardly in said tubular member". This step is clearly not shown or suggested by the

prior art combination. Dependent Claim 37 corresponds to the limitations of previous dependent Claim 27.

Based upon the foregoing analysis, Applicant contends that independent Claim 30 is now in proper condition for allowance. Additionally, those claims which are dependent upon independent Claim 30 should also be in condition for allowance. Reconsideration of the rejections and allowance of the claims at an early date is earnestly solicited. Since no new claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

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